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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,818	09/22/2003	Robert R. Rice	024.0016	1950
29906 7590 11/14/2007 INGRASSIA FISHER & LORENZ, P.C. 7150 E. CAMELBACK, STE. 325 SCOTTSDALE, AZ 85251			EXAMINER BELLO, AGUSTIN	
			ART UNIT 2613	PAPER NUMBER
			MAIL DATE 11/14/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/668,818	<b>Applicant(s)</b> RICE ET AL.	
	<b>Examiner</b> Agustin Bello	<b>Art Unit</b> 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 June 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 21-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 21-22, 25-28, 31-35, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Numata et al. (U.S. Patent Application Publication No. 2002/0105704) in view of Siegman (U.S. Patent No. 6,751,388) and Aoki (U.S. Patent No. 6,757,499).

Regarding claims 21, 26, 31, 33, 34, and 37, Numata teaches a light source (reference numeral 111 in Figure 1) for transmitting data from a source as a first light signal, wherein the first light signal comprises a sequence of short light pulses (paragraph [0008]); a lens (reference numeral 112 in Figure 1) having a focal length, placed in a path of said first light signal at a distance of approximately said focal length from an end of said LCMFOC (reference letter Z1 in Figure 2), wherein the lens is located to receive said first light signal from said light source and to collimate and focus said short light pulses onto the end of the LCMFOC such that a diameter of focused short light pulses is approximately equal to a core diameter of the LCMFOC to excite low fiber modes and minimize excitation of higher order fiber modes in the LCMFOC (paragraphs [0051], [0055] , wherein the LCMFOC is designed to decrease higher order fiber modes (paragraph [0051]; Figure 9) which increase pulse spreading that limit the length/data rate product and to thereby increase a-transmission distance through the LCMFOC and output second light pulses which include substantially only lower order fiber modes, wherein the LCMFOC

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comprises: an exposed core having the core diameter which receives the focused short light pulses (inherent in Figures 1 & 2). Numata differs from the claimed invention in that Numata fails to disclose two aspects of the claimed invention.

First, Numata fails to specifically teach using a step index fiber optic cable having a doped cladding layer for absorptive attenuation of higher order modes. However, Siegman, from the same field of endeavor discloses the use of a step index fiber optic cable having a doped cladding layer for absorptive attenuation of higher order modes (column 1 lines 36-47; column 3 lines 47-58; column 7 lines 60-61; column 11 lines 50-54; e.g. "index-antiguinding" throughout). One skilled in the art would have been motivated to employ a step index fiber optic cable having a doped cladding layer for absorptive attenuation of higher order modes in order to reduce the amount of mode mixing and randomizing of propagating modes to reduce dispersion (column 7 lines 1-15 of Siegman). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use a step index fiber optic cable having a doped cladding layer for absorptive attenuation of higher order modes as taught by Siegman in the device of Numata.

Second, Numata fails to specifically teach that said light source transmits data at greater than 10 gigabits per second. However, Aoki teaches that this concept is well known in the art and common (column 1 lines 45-50). One skilled in the art would have been motivated to include a transmitter with the ability to transmit at greater than 10 gigabits in order to transfer a large amount of information in a short period of time. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a light source that transmits data at greater than 10 gigabits per second.

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Regarding claim 22, 32, and 35, Numata teaches that said lens (reference numeral 112 in Figure 1) collimates said first light signal to reduce an excitation of higher order modes generated in said LCMFOC.

Regarding claim 25, Numata teaches a receiver coupled to an opposing end of said large core multimode fiber optic cable for receiving said transmitted data (reference numeral 22 in Figure 7 of Numata).

Regarding claim 27, Numata teaches that the core diameter is greater than or equal to 50 microns (paragraph [0006]).

Regarding claim 28, the combination of references and Siegman in particular teaches that the LCMFOC comprises a selected step index LCMFOC (column 1 lines 36-47; column 3 lines 47-58; column 7 lines 60-61; column 11 lines 50-54)

3. Claims 23 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Numata in view of Siegman (U.S. Patent No. 6,751,388) and Aoki (U.S. Patent No. 6,757,499), as applied to claims 21 and 26 above, and further in view of Edvold (U.S. Patent No. 6,724,956).

Regarding claims 23 and 29, the combination of Numata, Siegman, and Aoki differs from the claimed invention in that it fails to specifically teach that said light source provides light having a wavelength greater than 750 nanometers. However, Edvold teaches that the industry standard for transmitting light on fiber is 1550 nm with wavelengths typically in the 1530 to 1565 nm range (column 1 lines 28-44). One skilled in the art would have been motivated to transmit a wavelength at greater than 750 nanometers in an optical system due to favorable signal loss and dispersive properties at these wavelengths (Edvold column 1 lines 27-44). Therefore, it would have been obvious to one skilled in the art at the time the invention was

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made to transmit a wavelength at greater than 750 nanometers in the optical system of the combination of references.

4. Claims 24 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Numata in view of Siegman (U.S. Patent No. 6,751,388) and Aoki (U.S. Patent No. 6,757,499), as applied to claims 21 and 26 above, and further in view of White (U.S. Patent No. 6,476,951).

Regarding claims 24 and 30, the combination of references as applied to claims 21 and 26 differs from the claimed invention in that it fails to specifically discuss or disclose launching power to said LCMFOC at 20dBm or more. However, White teaches that this concept is well known in the art (column 7 lines 10-19). One skilled in the art would have been motivated to launch an optical signal at 20 dBm or more in order to compensate for the known attenuation of the signal by the fiber. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to launch an optical signal at 20 dBm or greater in the device of the combination of references.

5. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Numata in view of Siegman (U.S. Patent No. 6,751,388) and Aoki (U.S. Patent No. 6,757,499), as applied to claims 21, 26, and 34 above, and further in view of Edvold and White.

As noted above in the rejection of claims 23-24 and 29-30, the combination of Numata, Siegman, and Aoki obviates the transmission of data at a rate greater than 10 Gbps. However, the combination of references differs from the claimed invention in that it fails to specifically teach that the launch power is greater than 20dBm or that wavelengths greater than 750 nm are used.

However, Edvold teaches that the industry standard for transmitting light on fiber is 1550 nm with wavelengths typically in the 1530 to 1565 nm range (column 1 lines 28-44). One skilled

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in the art would have been motivated to transmit a wavelength at greater than 750 nanometers in an optical system due to favorable signal loss and dispersive properties at these wavelengths (Edvold column 1 lines 27-44). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to transmit a wavelength at greater than 750 nanometers in the optical system of the combination of references.

Furthermore, White teaches that launch power greater than 20dBm (column 7 lines 10-19) is well known in the art. One skilled in the art would have been motivated to launch an optical signal at 20 dBm or more in order to compensate for the known attenuation of the signal by the fiber. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to launch an optical signal at 20 dBm or greater in the device of the combination of references.

### ***Response to Arguments***

6. Applicant's arguments filed 06/27/07 have been fully considered but they are not persuasive. The applicant argues that even though Siegman teaches that the cladding layer may be doped, Siegman in no way teaches that the cladding would absorptively attenuate higher-order fiber modes. However, the examiner disagrees. As noted in the office action, Siegman specifically discloses that the cladding is doped and further discloses that the refractive index profile and the gain profile of the fiber determine the modes that propagate through the fiber. As further noted in Figure 7A, second order mode 30 shows little overlap with doping profile 20A and therefore will not be gain guided. Moreover, Siegman discloses that index-antiguinding is achievable, thereby preventing certain modes, i.e. higher-order fiber modes, from being guided. The applicant will surely appreciate that if a mode of light enters a cladding portion of fiber and

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is neither guided nor provided gain, it will be attenuated and its power dissipated as heat. The fact that Siegman teaches that this concept is applicable in a radiator does not preclude its use in the system of Numata since both are fiber based systems and focus on reduction of higher-order fiber modes.

7. In response to applicant's argument that the combination of Numata and Siegman departs from the intended operation of Siegman's fiber laser and the intended operation of Numata's system, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

8. In response to applicant's argument that Siegman is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Siegman is reasonably pertinent to Numata's desire to reduce higher-order fiber modes.

### ***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO



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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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A handwritten signature in black ink, appearing to read "A. Bello". The signature is fluid and cursive, with the first letter of the last name being a large, stylized "B".

Agustin Bello  
Primary Examiner  
Art Unit 2613

AB